

TECHNICAL BULLETIN: FAIRCHILD 661-661TL

FAIRCHILD RECORDING EQUIPMENT CORPORATION, 10-40 45th Avenue, Long Island City 1, N. Y.

IS FEEDBACK, LIMITER "BREATHING", TAPE NOISE or STUDIO SEPARATION A PROBLEM? THEN HERE'S IMPORTANT NEWS FOR YOU:

- Major record company uses the FAIRCHILD "AUTO-TEN" to radically improve balance and separation, and simultaneously reduce setup time.
- Major TV and radio station network starts to use the FAIRCHILD "AUTO-TEN" to automate studio operations.
- One of America's largest banks makes a closed circuit audio system operate effectively and successfully after three years of research, only with an "AUTO-TEN".
- Major motion picture company uses the FAIRCHILD "AUTO-TEN" for noise reduction in film and tape recording.

HOW DO THEY SOLVE THEIR PROBLEMS? . . . THEY ALL USE

THE FAIRCHILD "AUTO-TEN"



Model 661



Model 661 TL

WHAT IS THE "AUTO-TEN"?

The AUTO-TEN is an automatic attenuator designed to reject unwanted signal or noise. It is made possible by the use of today's solid state technology.

The AUTO-TEN should not be confused with limiters or compressors, or other devices that change dynamic range, for the AUTO-TEN does not change, or squeeze or alter the dynamic range of program material. Perhaps the easiest way to think of the AUTO-TEN is to think of it as an on-off switch with a brain. There have been voice-operated relays, but they did not possess real discretion. The AUTO-TEN has discretion through the use of a transistor amplifier and the FAIRCHILD solid state sensing cell, and a variable release time.

HOW DOES THE AUTO-TEN WORK?

The FAIRCHILD AUTO-TEN uses an exclusive FAIRCHILD sensing cell and sensing amplifier. The AUTO-TEN automatically and rapidly provides attenuation from 3 db to 60 db.

The sensing cell is actuated by a transistorized sensing amplifier. The amplifier continually senses the audio signal of the channel in which the AUTO-TEN is placed. The sensing amplifier has two controls: a threshold and a release time. A threshold is selected by the operator, then when the signal falls below the present threshold, information is attenuated up to 60 db. The release time control allows a variation from 300 milliseconds to 7 seconds. Release time governs the amount of time needed for complete attenuation. This permits slow or rapid attenuation as dictated by the program material and the production effect desired.

The transistorized amplifier senses the audio signals and actuates the sensing cell. Only the cell is part of the audio circuit. The cell is part of an attenuation network and its resistance varies depending on information fed to it by the sensing amplifier. By simply changing resistance, the cell cannot introduce distortion or frequency discrimination into the regular audio circuit.

HOW MANY OF THESE PROBLEMS HAVE PLAGUED YOU in your audio experience? (We'll bet all ten!) And, in most cases, the problem was allowed to continue because there just wasn't a reasonable solution.

- 1—providing an effective yet economical noise reduction system in tape and film recording
- 2—minimizing "breathing" in compressors and limiters
- 3—replacing acoustic screens and shields in studio recording and broadcast
- 4—providing a design answer to automated audio switching and broadcast
- 5—maintaining higher PA levels and minimizing feedback
- 6—minimizing noise in multi-track tape playbacks, transfers and reductions
- 7—maintaining "tight" sound on recording in large, live halls . . . maintaining balance in studio recording
- 8—automatic mixing in PA and recording
- 9—maintaining two way conversation with a mike and a loudspeaker next to each other without feedback
- 10—recording of automated and manual slide films as a simultaneous operation

BUT, with the FAIRCHILD AUTO-TEN installed, the problems are gone. Here are examples of the AUTO-TEN in action:

1. THE AUTO-TEN IN PUBLIC ADDRESS INSTALLATIONS:

Minimizes feedback in PA. One of the basic causes of feedback in PA work is the always-open mike and feedback occurs more often when there is no signal present but the mike is still open. If there is no useable signal, the AUTO-TEN automatically closes the channel. Where more than one microphone is in use, the chance of feedback is greatly increased. The use of an AUTO-TEN in each microphone channel would then provide the answer to effective feedback control since there would be no open, unused mikes except when signal is present. Higher average PA levels can then be maintained.

2. THE AUTO-TEN IN CLOSED CIRCUIT AUDIO CONFERENCE SYSTEMS:

More and more in today's business operations there is a demand for 2-way closed circuit conversations. Up to now, comparatively cumbersome systems have been employed including the use of relays. Such systems

have been actually one-way conversations because the receive channel is deactivated during send operation due to the danger of feedback. However, with the use of an AUTO-TEN it is now possible to send and receive simultaneously without feedback. It is even possible through the use of longthrow, highly directional microphones to maintain talking positions 15 feet away from the microphone and still have adequate levels and clarity on loudspeakers without feedback. A more natural conversation pattern is now possible through the use of the AUTO-TEN. A technical paper presented before the 1962 AUDIO ENGINEERING SOCIETY on such a two-way closed circuit system is available upon request.

In conference recordings, the presence of an AUTO-TEN on each microphone permits greater intelligibility of speech. The microphone only opens automatically when the speaker has something to say. Random noise reflections from walls, paper shuffling, boomy room acoustics etc. are now eliminated for there are no open mikes except when signal demands its presence in the channel. The result is high intelligibility of information stored on tape. No audio operator is needed, providing a confidential nature to many meetings.

3. USE OF THE AUTO-TEN WITH COMPRESSORS AND LIMITERS:

A major problem with compressors and limiters is the "breathing" effect, the build-up of noise and studio noise when there is no information present to compress or limit. As an example, if limiting or compression is set for 10 db, then when regular program material is not present, the gain of the limiting or compressing amplifier increases 10 db and with it a random noise buildup. One other annoying side effect of this "breathing" is that, as the gain of the limiter or compressor increases, the balance of the mixed sound is changed, often with an increase in boominess. An AUTO-TEN with its correct threshold setting placed at the output of the limiter or compressor eliminates these problems.

4. THE AUTO-TEN and ACOUSTIC CONTROL:

With multiple microphone pickup almost mandatory in today's recording sessions, the problems of leakage of unwanted sounds into unused but "live" microphone channels becomes a continual problem that detracts from the final recorded sound. At present isolation screens are used in an attempt to isolate sections of an orchestra or isolate a vocalist or soloist from an orchestra. The isolation effects of these screens are negligible for they are usually vertical and nothing prevents sound from entering from over the top of such screens. The use of the screens entails costly setup time and the ever-present danger of the screens tipping over. These rudimentary sound isolation techniques can now be discarded with the use of the FAIRCHILD AUTO-TEN.

The Auto-Ten can provide up to 10 db greater isolation than the conventional acoustic screens. The AUTO-TEN can be inserted with patch cords rather than mixing personnel moving screens before or during a session. Through the use of its variable threshold and release time, the AUTO-TEN can also provide the ability to change acoustic conditions in a studio or live hall in a simple and inexpensive way.

5. THE AUTO-TEN and AUTOMATED STATION OPERATION:

The FAIRCHILD AUTO-TEN can be designed into new or existing consoles to provide an automated signal switching system. In stations employing one-man operation (DJ also spinning his own records and tapes), the manual opening and closing of announce microphones, turntables and tape machines can now be completely automatic. With these operations no longer a problem, the DJ can really concentrate on copy.

In TV operations employing film and live material, operations can be automated in a similar manner. In live TV pickups using multi-microphones, the AUTO-TEN can be of real value to the TV audio mixer. With an AUTO-TEN in each microphone channel, when there is no useable signal present on the set in a particular set area, the microphone channels open automatically only when a signal passes the selected threshold, resulting in a reduction of set noise pickup. The AUTO-TEN provides smoother operations with less personnel fatigues, and less personnel.

6. THE AUTO-TEN IN TAPE AND FILM NOISE REDUCTION:

Economical and effective noise reduction is now possible in tape, disk and film recording. In situations requiring reduction of film or tape noise, a reduction of only 6 or 8 db is sometimes more desirable than greater reduction. The AUTO-TEN can be adjusted to give anywhere from 3 to 60 db of noise reduction without the use of expensive present day automatic attenuation circuits.

With the AUTO-TEN it is possible to use noise reduction on several tracks coming into a mixing console rather than on the final mixed channel (the usual present procedure). This provides the mixer with greater flexibility in governing the amount of noise reduction for each track mixed rather than employing an overall compromise noise reduction figure. And, the mixer need not be concerned with opening or closing "pots" at the end of a loop or track. The AUTO-TEN does this automatically at fantastically low cost per channel.

In magnetic tape transfer where as many as eight or ten tracks are used, they may be mixed down to two tracks. Presently the build-up of tape noise on multi-

track transfers becomes a serious quality problem. The AUTO-TEN can solve this problem. An AUTO-TEN used in each channel will allow only useable program material to be recorded from each track.

On tape with long, silent pauses, print-through becomes a problem. But, with an AUTO-TEN in the channel this low level print-through can be eliminated. This is particularly important in the production of language instruction tapes where there may be long pauses between words. With the AUTO-TEN when a channel does not have useable program material on it, it closes down eliminating the print-through on the finished product.

The AUTO-TEN is a tremendous quality-control step forward in the production of films, tapes and records through its ability to minimize unwanted noise.

7. THE AUTO-TEN AND SLIDE FILMS:

The production of slide films presents an ideal example of the AUTO-TEN in action and the dollar savings it can accumulate. Presently, two types of slide films are made: one with an inaudible signal for automatic projectors and one with an audible signal for manual operation. With an AUTO-TEN the manual and automatic versions can now be made simultaneously. No need to edit in gongs or other audible signal at a later date. One simple arrangement would be to use an AUTO-TEN on the narrator's channel; locate the audible signal a good distance from the narrator but in the same studio. Once the narrator finishes a sequence, his program channel would be attenuated. The audible signal in the studio would sound but would not actuate the AUTO-TEN. The audible signal could then be combined with an isolated multiple of the narrator program channel and could be fed to another tape machine for the production of the manual version of the slide film. The AUTO-TEN thereby eliminates the need for future editing. This not only reduces the production costs, but provides a reduction in time needed to deliver a finished product of both types (automatic and manual) to the client.

8. THE AUTO-TEN IN AUTOMATIC MIXING IN PA, BROADCAST AND RECORDING:

The AUTO-TEN can also be used as a "ducker" in paging, broadcast, recording and public address systems. The AUTO-TEN can handle two inputs - one program channel taking precedence over the other and thereby "ducking" or fading the second channel. One channel could conceivably be background music and the other announcements. As soon as the announce microphone was used, channel one would automatically and rapidly fade anywhere from 3 to 60 db depending upon the settings of the AUTO-TEN, and channel one would come back up to normal level after completion of the announcement. This is valuable in paging

systems in schools, plants, airports, terminals etc., and there are no "clicks" when the announce channel becomes dominant. A similar arrangement can be used in recording operations, particularly where a vocal or announcement is "overdubbed" on top of an existing music or effect track.

The AUTO-TEN comes in two convenient sizes each easily rack mounted or installed in consoles or other modules. Its installation is simple, straightforward and fast. The specifications of the AUTO-TEN are deceptively simple for a device that can handle a variety of complex attenuation assignments. REVIEW THEM — you'll see the AUTO-TEN can be easily integrated into a variety of circuits.

SPECIFICATIONS OF THE AUTO-TEN

Input level requirements to AUTO-TEN	- 35dbm or higher, no higher than +25dbm
Input Impedance	150 ohms to 47,000 ohms
Output Impedance	150 ohms to 47,000 ohms
Insertion Loss	2 db at 150 ohms .5 db at 600 ohms
Frequency Response	Flat (resistive network)
Distortion	None
Power Requirements	6.3 V AC 60 or 50 cycles at 200 ma 8 V DC at 200 ma
Dimensions:	Model 661 Round container 2 7/8" dia x 3 1/2" deep Model 661 TL Thin line container — 1 1/2" W x 3" H x 6 1/2" D
Finish	Dressplate — anodized Figures — deep etched and filled

OTHER IMPORTANT FAIRCHILD PROFESSIONAL PRODUCTS

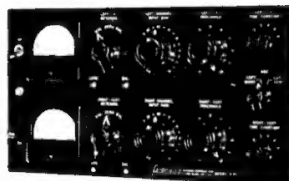
NEW FAIRCHILD CONAX ELIMINATES PRE-EMPHASIS PROBLEMS AUTOMATICALLY!



- CONAX will produce increased signal levels in recording and FM broadcast
- CONAX will reduce distortion in tape recording and tape duplication
- CONAX will minimize tracing distortion

CONAX has been engineered by FAIRCHILD to cope with the problem of distortion produced in recording and broadcasting by excessive, instantaneous high frequency peaks. The CONAX "pre-views" program material in emphasized form for efficient high frequency control. The device is based on the integrating properties of the human ear. The CONAX action is inaudible and instantaneous — 1/40,000ths of a second. CONAX efficiently eliminates problems of overload from loud cymbals, muted trumpets, bells, and the ever-present sibilant singers without quality degradation. Model 602 — Stereo \$495. 600 — Mono \$330.

ATTACK TIME: 50 MICRO-SECONDS



WITH THE FAIRCHILD 670 LIMITER

The Fairchild 670 Limiter is used by more record companies throughout the world than any other limiter. More and more the Fairchild 670 is the standard for quality-conscious radio stations. Available in single channel or stereo. Write today for complete details.

Price: \$1495.00

ANNOUNCING THE NEW VERSATILE FAIRCHILD 740 RECORDING LATHE



The Fairchild 740 embodies all the robustness, ruggedness and reliability normally associated with FAIRCHILD products. Unique and alone in its price field, the 740 equals performance of other more expensive units. The Fairchild 740 with Variable Pitch included, is designed for the recording studio and the recordist demanding perfection — but with flexibility for automation if so desired. Write today for complete details.

Price: \$2,675.00